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(54) **LOW COST RAPID MINE CLEARANCE SYSTEM**

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(58) **Field of Search** 102/402, 406; 89/1.13

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,396,699 A * 3/1946 Hayes et al. 200/61.01
3,016,829 A * 1/1962 Hall 102/418
3,790,927 A * 2/1974 Chwastyk 367/133
3,922,635 A * 11/1975 Colvin et al. 367/126
4,938,136 A * 7/1990 Gould 102/406
5,598,152 A * 1/1997 Scarzello et al. 340/850
5,708,230 A * 1/1998 Woodall et al. 102/402
5,844,159 A * 12/1998 Posseme et al. 89/1.13
6,055,214 A * 4/2000 Wilk 367/99
6,286,431 B1 * 9/2001 Cangelosi 102/402
6,634,273 B2 * 10/2003 Cangelosi 89/1.13

* cited by examiner

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(57) **ABSTRACT**

A method and apparatus to clear mines uses tag particles dropped into ambient water across a wide area by an aircraft to sink and stick to submerged mines. The tag particles each contain a gas volume dimensioned to resonate with impinging acoustic energy and reflect portions of the impinging acoustic energy from a targeted mine. An unmanned underwater vehicle platform having a sonar system provided with at least one transducer projects the acoustic energy through the ambient water. At least one hydrophone transducer in the sonar system receives the reflected portions of the projected acoustic energy to locate a targeted mine to enable its destruction by high-energy supercavitating projectiles fired from the platform. Tag particles dissolve after a period of time to provide virtually no discernable traces of a mine hunting operation.

5 Claims, 4 Drawing Sheets